The Graviton Experiment

by Robert de Hilster

Abstract

This paper describes and experiment which attempts to prove that the graviton or gravity quantum exists by using the concepts introduced by Argentinean physicist Dr. Ricardo Carezani. The experiment tries to find a difference between Newton’s empirical gravity equation and the equation developed for the finite quanta the graviton. The results of the predictions by the graviton equations give different results depending on the experimental setup. Several differences in the equations are discussed along with a general discussion of possible experimental setups. Although one experiment was performed, the setup had inherent difficulties and could not yield any conclusions. Variations of this experiment are proposed, but there may be other experiments that are easier to do.

Contents

Premise

Carezani's Pico Graviton

Argentiean physicist Dr. Ricardo Carezani's work on gravity spans many decades but evidence for the possible existance of the pico-graviton (Carezani's term for the graviton) has been gathered over recent years by the Society for the Advancement of Autodynamics. The evidence is found in the anomalies that can be explained by the increase of mass caused by the capture of gravitons by mass, thus causing an increase in the mass itself. This explains all perihelion advance including the famous DI Herculis Binary Star system, lunar distancing, the Alias Anomoly, and the pioneer slowdown.

With this in mind, he suggested a method to prove the graviton exists buy a simple experiment that is a modification of the Cavendish experiment. Figure 1 is the a drawing of the Carezani experiment.

M1 is a block of lead of a given size. M2 and M3 are also blocks of lead of the same size. With the blocks placed as shown in Figure 1, a barbell is placed in the position idicated by 'B'. The barbell has a piece of lead on each end to balance the vertical force of gravity. In what direction will the barbell move?

By simple observation, if gravity is a pulling force, the barbell should move toward M2 and M3, the larger mass. But if gravity is a particle, then the particles coming though the gap between M2 and M3 will cause the barbell to move toward M1, the smaller mass. By observing the movement of the barbell, the answer is known.

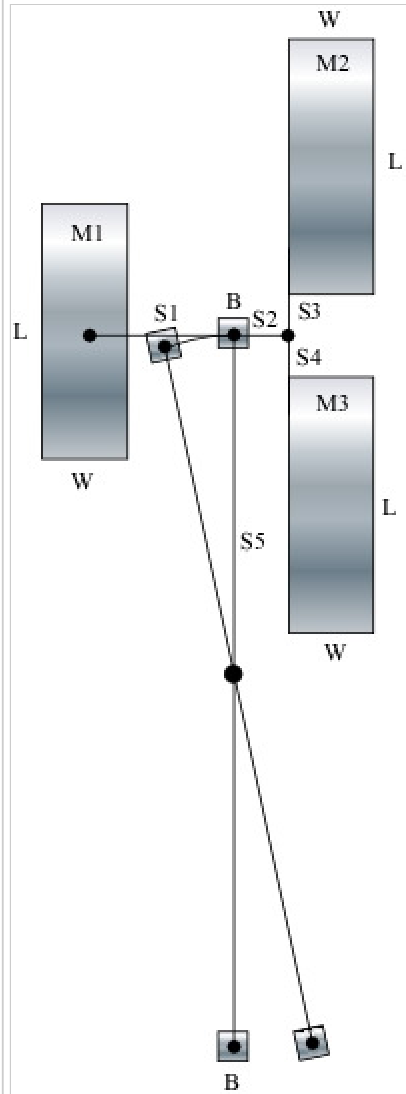

Figure 1 - Mathematical Setup of Carezani Test

The Approach

There were three steps taken in doing each experiment. First, calculations were made to predict the results. Second, the experiments were run, guided by the calculations. The final step was to evaluate the results and come to some conclusion.

Mathematical Predictions

It is known that Newton proposes no mechanism for gravity. The author of this paper considers General Relativity's space-time to be purely mathematical and not physical.

The calculations presented in this document are done using Newton's Universal Law of Gravitation and the graviton equation explained in the paper titled "The Graviton Equations".

Basic Equations

Pulling Force

To calculate the pulling force, Newtons Universal Law of Gravitation was used. The three blocks were divided into 4 sections. For a given position of the barbell, the distances to the center of each section were calculated. Each force is a vector from the center of each section to the center of the barbell. Since only the left/right forces are needed to calculate the force curve, each force equation was multiplied by the cosine of the angle.

$$(1) \qquad F = \sum_{s=1}^{N} \left[\frac{G M_s m \cos(A)}{R^2} \right]$$

Where:

- F is in Newtons
- N is 12, the total number of sections of for all thre blocks
- G is $6.67x10^{-11}\ Nt * M^2 / Kg^2$
- s is the number of the section
- Ms is the mass of each section in Kg
- m is the mass of the lead weight at the end of the barbell
- A is the angle of line of force between section of Ms and m
- R is distance between the Ms section and m

The sign of the resultant force shows the direction that the barbell should move. The cosine of the angle A is negative on the left and is positive on the right. Since this is a pulling force, a positive force pulls the barbell to the right. A negative force pulls the barbell to the left.

Pushing Force

The pushing force is calculated using equation 9 of the above referenced paper and is repeated here as equation 2

$$(2)\qquad F_m = \sum_{p=0}^{179} \sum_{a=0.5}^{359.5} N_g(1 - Z_e Ab_c D_e) \sin(a) \cos(|90 - p|)(Z_m Ab_c D_m F_g)$$

Since this is an equation for earth and moon, some changes must be made to fit the graviton experiment. The changes are:

Lead is Used

The graviton experiment uses a balanced barbell that cancels out earths gravity. Although the moon may have a small effect on the experiment, the test is done over a very short period of time and the force of the moon is ignored. Finally all objects in the experiment are made of lead, so the desity of lead is used in the equation.

Horizontal Force

Equation 2 uses the sine of the angle in the plane to calculate the vertical force. In the graviton experiment, the horizontal force is required and so the cosine is used.

The Pushing Equation

$$(3)\qquad F_m = \sum_{p=0}^{179} \sum_{a=0.5}^{359.5} N_g(1 - Z_{Pb} Ab_c D_{Pb}) \cos(a) \cos(|90 - p|)(Z_{Pb} Ab_c D_{Pb} F_g)$$

The sign of the resultant force shows the direction that the barbell should move. The cosine of the angle on the left is negative and on the right is positive. Since this is a pushing force, a positive force pushes the barbell to the left. A negative force pushes the barbell to the right. Note, this is opposite of the pulling force shown above.

Since the direction of the force for pushing and pulling have opposite signs, the value of Fg in the graphs will be shown as a minus value so that the force curves can be more easily compared.

The Force Curves

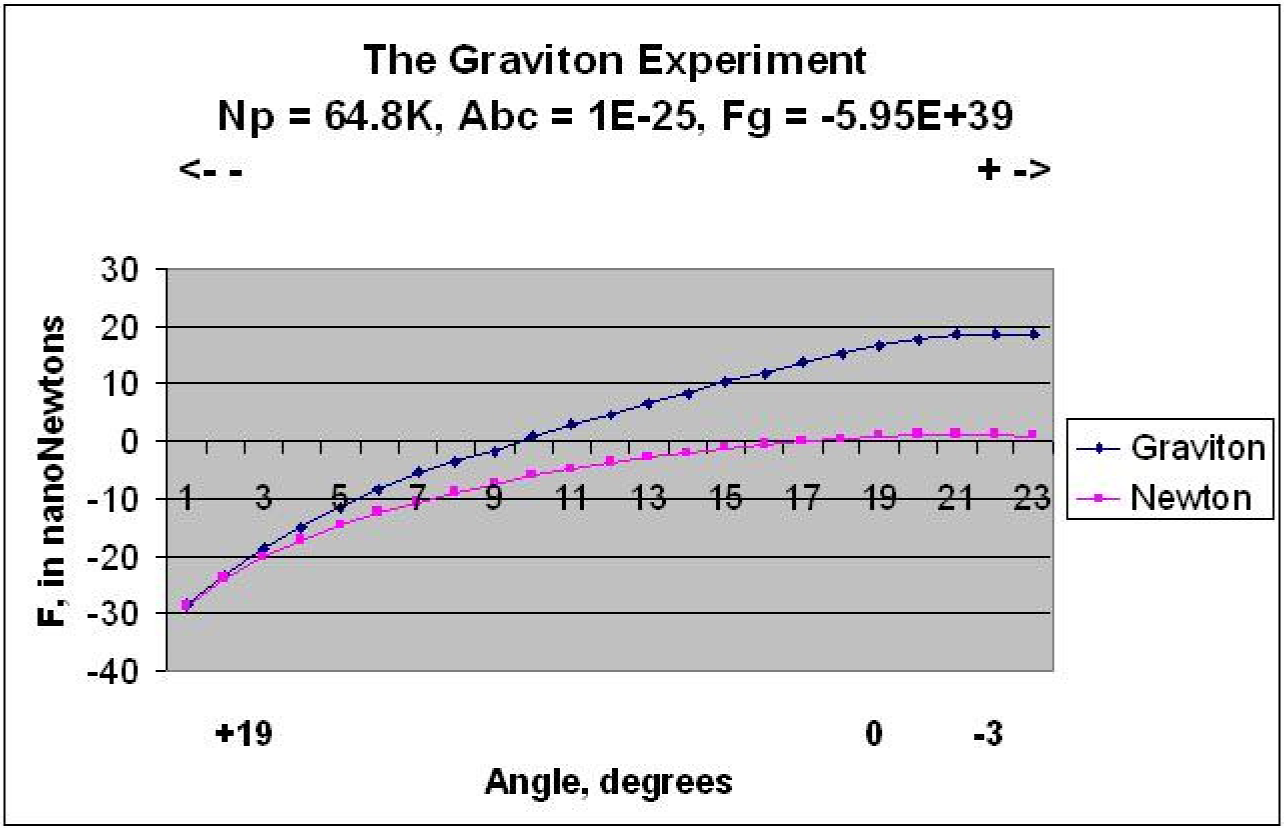

Figure 2 - Force Curves for Graviton Experiment

The Curves are Different

This is the first time that the force curves are significantly different. Curves shown in other documents have only a small difference and therefore are very similar. Not only is the shape of the curves different but the zero crossing point of the force is not the same. This should give a good opportunity to determine which equation is more accurate.

It is also interesting that the graviton curve is the same even when the absorption constant is set to different values.

Just Place the barbell and Watch

If the barbel is placed at point 7, both curves indicate that the barbell will move to the left toward M1. If it is placed at point 21, the both curves indicate the barbell will move to the right towards M2 and M3.

But if the barbell is placed at pont 12, then just watch which way the barbell moves and the answer is clear. If it were only that simple. However, if there is not enough lead, nothing moves.

The First Attempt

In the paper presented at the NPA conference in May of 2007, results were reported from the first attempts at the experiemnt. It was clear that there were problems with our physical setup.

Moving the Barbell

The physical setup had problems getting the barbell to move. So it was decided to push the barbell, since initial velocity does not interfere with the calculation of force. Either a slow down or a speed up of the barbell will indicate that there is a force present. But the mechanisms to push the barbell was irratic. The velocity varied and the force cause the barbell to bounce, that is move up and down.

A simpler mechanism should be better. Cavendish used a fiber to hang the barbell. To calculate G, he used the torsion constant of the fiber to get the result.

By hanging the barbell with a fiber and waiting for the torsion to get to zero, a stable condition is obtained. Now hold the barbell steady and twist the fiber enough turns until the barbell moves at a slow rate. The resultant torsion force on the barbell needs to be the same order of magnitude each time the barbell is releassed.

Releasing the Barbell

It is nescessary to release the barbell such that there is no external force causing it to bounce around. If a thin rod with a soft pad on the end were held against the barbell and it could be pulled away cleanly, the barbell should start to accelerate due to the tension on the fiber. Unfortunately the thin rod may have to be on both ends of the barbell and released at exactly the same time. No one said that it was going to be easy.

Measuring the Time

In the first experiment a high quality camera was used to measure the time for each quarter inch. The accuracy was not very good. The accuracy of an electronic timer would be much better. So a new method is suggested.

First, build a set of LED sensors at about 1/4 inch intervals and place them under the path of the barbell. Place an LED transmitter on the barbell so that as it passes over the sensors. As the barbell moves over the sensors record the time using the electronic timing device.

Finding the Distance

Velocity is based on distance and time. The timing may be solved but knowing the distance is not easy. Even if the LED senors are place exactly at 1/4 inch, the sensitivity of the sensors may change the apparent location. So baseline tests must be run to determine the actual optical location of each sensor.

If the baarbell could be moved at a constant speed, then it would be possible to use timing to get a measurement of the spacing. Moving the barbell at a constant velocity may not be easy. One simple method is to twist the fiber many turns while holding the barbell steady. This would put a high tension on the fiber. So when the barbell is released, let the barbell turn 360 degrees and hope the velocity is stable. Knowing the overall spacing, an average time per space could be calculated. The individual spaces could be be calculated as a ratio of the actual time over the average time. This is not easy!

The Next Attempt - Three Tests to Run

For the next attempt, the plan is to run three different tests but run them the same way each time. The three tests are: 1)With no Lead, 2)With M1 only, and 3)With M1, M2 and M3(The real experiment). Set up all three tests exactly the same way, with the same number of twists on the fiber, the same release mechanism, the same electronics, and then move the barbell in the same direction.

References

1. Gravity Experiment NPA Presentation, by Robert de Hilster, David de Hilster, and Geoff Hunter. Preneted at the NPA conference in May of 2007.

2. The Graviton Equations, by Robert de Hilster, presented at NPA 2008.

3. An Equation for G, by Robert de Hilster, presented at NPA 2008.